

Abstract Submitted
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Doped and functionalized ZnO nano films and their applications for gas sensors¹ JIN CHU, XIAOYAN PENG, PETER FENG, University of Puerto Rico, FENG TEAM — We demonstrate efficient gas sensors using Cu-doped ZnO nanowires and Li atoms-modification of ZnO nanorods. Various Cu-doped ZnO nanowires were synthesized on Si substrates by plasma sputtering at 300 °C with deposition duration of 30 minutes, while Li-coated ZnO nanorods were prepared by coating Li on the surface of the as-grown nanorods. Raman and EDX data indicated that the obtained ZnO nanowires and nanorods have wurtzite structure with Cu-doping concentration of 1 wt.% and ZnO nanorods with Li-coated concentration of 3 wt.%, respectively. The sensing properties were examined by being exposed to H₂, N₂ and CH₄ gases with a home-made system that can facilitate the detection of the resistance change and the control of gas flow as well as temperature. The sensitivities of both samples increased with the operating temperature from RT to 200 °C and signal intensity of the sensor increased with gas concentration at each type of gas. Experimental data indicates that both types of samples-sensors showed highly sensitive to H₂ and selectivity against N₂ and CH₄. However, the response time for Li-coated ZnO nanorods-based sensor is less than 1 second, much quicker than that for Cu-doped ZnO nanowires-based sensors.

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